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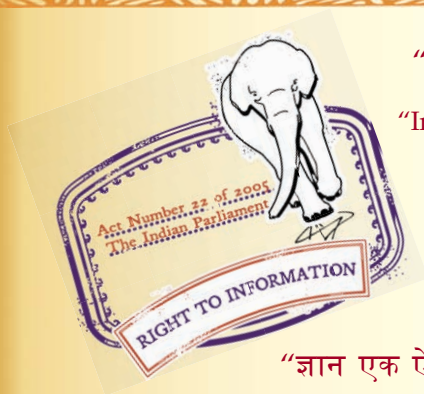Mazdoor Kisan Shakti Sangathan
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METHODS FOR DETERMINATION OF UNIVERSAL COUNT OF WOOLLEN AND WORSTED YARN

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NEW DELHI 110002

Indian Standard

METHODS FOR DETERMINATION OF UNIVERSAL COUNT OF WOOLLEN AND WORSTED YARN

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Indian Standard

METHODS FOR DETERMINATION OF UNIVERSAL COUNT OF WOOLLEN AND WORSTED YARN

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 11 August 1964, after the draft finalized by the Textile Standards Sectional Committee had been approved by the Textile Division Council.

0.2 Universal count system has been unanimously adopted at the level of International Organization for Standardization (ISO). Further, as the Government of India have adopted metric system of weights and measures, Indian woollen industry is also expected to adopt the universal count system for designating the count of yarn. This standard has, therefore, been prepared with a view to eliminating, as far as possible, variations in the testing procedure followed for the determination of universal count of woollen and worsted yarn.

0.3 All quantities and dimensions in this standard have been expressed in the metric system; however, for guidance, the fps system values have also been specified wherever necessary.

0.3.1 Conversion factors for converting woollen and worsted counts to universal count and *vice versa* are given in Appendix A.

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

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1. SCOPE

1.1 This standard prescribes two methods for determination of universal count of woollen and worsted yarn. The methods are applicable to single or plied yarn.

> NOTE — In the case of plied yarn, the methods are applicable for the determination of resultant count of the yarn.

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*Rules for rounding off numerical values (*revised*).

2. PRINCIPLE

2.1 The first method is based on determining the weight of the specimen after conditioning it in the standard atmosphere. The second method is based on determining the weight of the specimen by drying it in a drying oven and calculating from this weight, its conditioned weight by adding the moisture regain value.

3. TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Package — A general term for a bobbin, bundle, cheese, cone, cop or pirn of yarn indicating that the yarn is in a form convenient for transport and further processing.

3.2 Universal Count, in tex — Universal count is a number indicating the weight per unit length, the basic unit of which is the tex. When universal count of yarn is expressed in tex, the count value indicates the weight in grams of one kilometre of yarn.

> NOTE — The weight per unit length of fibres as well as textile products like ropes, rovings, etc, may also be expressed in universal count system and in such cases, the following sub-multiple and multiple units may be used to avoid small fractions and large numbers respectively:
>
> 1 m tex (milli-tex) = 0·001 tex
> 1 k tex (kilo-tex) = 1 000 tex

3.3 Woollen Count — The number of 256 yard hanks of woollen yarn in one pound.

3.4 Worsted Count — The number of 560 yard hanks of worsted yarn in one pound.

4. SAMPLING

4.1 Lot — All the bales (or cases) of yarn of the same count and quality delivered to one buyer against one despatch note shall constitute a lot.

4.2 The conformity of a lot to a specification shall be determined by tests carried on sample selected from the lot.

4.3 Unless otherwise agreed upon between the buyer and the seller, the number of bales (or cases) to be selected at random from the lot shall be in accordance with col 1 and 2 of Table 1.

4.4 From each bale (or case) selected as in **4.3** two packages shall be selected at random.

4.5 From each of these packages two skeins shall be reeled off, each from a different portion, on a wrap reel with a girth of one metre (see Note).

4

When being reeled, the yarn shall be kept under sufficient tension to avoid kinks, curls and slacks in the yarn on the one hand, and stretch on the other, operating the reel at a speed of about 100 rev/min. The length of each skein so reeled shall be in accordance with the applicable requirements of Table 2. All such skeins shall constitute the **test specimens.**

NOTE — During the period of progressive changeover from the fps system to the metric system of weights and measures, a wrap reel of 1½-yd girth may be used.

TABLE 1 NUMBER OF BALES (OR CASES) TO BE SELECTED

(*Clause* 4.3)

NUMBER OF BALES OR CASES IN THE LOT	NUMBER OF BALES OR CASES TO BE SELECTED AT RANDOM
(1)	(2)
3 or less	1
4 to 10	2
11 „ 30	3
31 „ 75	4
76 or more	5

TABLE 2 LENGTH OF SPECIMEN

(*Clause* 4.5)

UNIVERSAL COUNT	No. OF TURNS OF THE REEL	LENGTH OF SPECIMEN
(1)	(2)	(3)
		m
Below 20 tex	100	100
20 tex to 50 tex	50	50
Above 50 tex	25	25

NOTE — If, during the period of progressive changeover from the fps system of weights and measures to the metric system, it becomes necessary to use a wrap reel of 1½-yd girth, the length of specimen shall be as indicated below:

Universal Count	No. of Turns of 1½-yd Reel	Length of Specimen	
		yd	m
Below 20 tex	73	109·5	100·13
20 tex to 50 tex	36	54·0	49·38
Above 50 tex	18	27·0	24·69

5. ATMOSPHERIC CONDITIONS FOR TESTING

5.1 The test prescribed in **9.2.1** shall be carried out in a standard atmosphere at 65 ± 2 percent relative humidity and 27° ± 2°C temperature (*see also* IS : 196-1950*) provided that throughout the test, the temperature does not vary by more than 1°C.

6. CONDITIONING OF TEST SPECIMENS

6.1 For the purpose of **9.2.1**, the test specimens shall be conditioned prior to evaluation in a standard atmosphere at 65 ± 2 percent relative humidity and 27° ± 2°C temperature, for 12 hours.

6.2 Prior to conditioning, the test specimens shall be pre-conditioned for one hour in a relative humidity of 10 percent and temperature of 50°C.

7. REAGENTS

7.1 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960†) shall be used for the purpose of this test.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

7.2 For the purpose of this test, the following reagents shall be used.

7.2.1 *Benzene or Petroleum Hydrocarbon Solvent*

7.2.2 *Sodium Oleate Solution* — one percent (*w/v*).

8. APPARATUS

8.1 Drying Oven — preferably of the ventilated type with positively induced draught, capable of maintaining an inside temperature of 105° to 110°C and provided with a balance capable of weighing correct to 0·01 g.

NOTE — If the oven is not provided with a balance, a suitable container to weigh the samples to constant weight may be used.

8.2 Pan Balance — with weights in grams and capable of weighing accurate to 0·01 g.

9. PROCEDURE

9.1 Preliminary Extraction of the Test Specimen — Take a specimen (*see* 4.5) and extract it first with benzene or petroleum hydrocarbon

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*Atmospheric conditions for testing.

†Specification for water, distilled quality (*revised*).

solvent for three extractions and then treat it for 20 minutes in sodium oleate solution at 40° to 45°C with a material to liquor ratio of 1 : 30. Removing the specimen from the sodium oleate solution, rinse it three times in lukewarm water, each rinse lasting for about five minutes. Remove the surplus water by shaking the specimen two or three times and then pressing it gently between two folds of blotting paper. Dry the specimen in air.

Note — If the agreement between the buyer and the seller so provides, the test specimen may not be treated for preliminary extraction; the fact shall, however, be stated in the test report.

9.2 Determination of Count — Determine the count of yarn by any one of the following two methods, as agreed to between the buyer and the seller or as specified in the material specification. In case of dispute, however, the method prescribed in **9.2.2** shall be followed.

9.2.1 *First Method* — Condition the test specimen (*see* **6.1**). Weigh it correct to 0·01 g and note its weight. Calculate its universal count in the manner prescribed in **10**.

9.2.2 *Second Method* — Transfer the test specimen (*see* **9.1**) to the drying oven and dry it to constant weight (*see* Note). Determine the oven-dry weight of the test specimen.

Note — Constant weight may be assumed to have been attained by the specimen when two successive weighings at intervals of 20 minutes differ by less than 0·05 percent.

9.2.2.1 Calculate the conditioned weight of the test specimen by the formula given below:

$$\text{Conditioned weight of the test specimen} = \frac{A \times (100 + R)}{100}$$

where

A = oven-dry weight of the test specimen, and

R = moisture regain value of 18½ percent for unchlorinated woollen and worsted yarns and 16 percent for chlorinated woollen and worsted yarns.

10. CALCULATION AND REPORT

10.1 Calculate the universal count of the test specimen using the formula given below:

$$\text{Universal count, in tex} = \frac{W}{L} \times 1\,000$$

where

W = weight in g of the test specimen determined either as in **9.2.1** or **9.2.2.1**, and

L = length in m of the test specimen.

7

10.2 Repeat the procedure prescribed in **9.1** and **9.2** with the remaining test specimens in the sample and determine their universal count in tex.

10.3 Calculate the mean of all the values and report it as the universal count in tex of the yarn in the lot. Report also the method followed for determining the universal count.

APPENDIX A

(*Clause* 0.3.1)

CONVERSION OF WOOLLEN AND WORSTED COUNT INTO UNIVERSAL COUNT AND *VICE VERSA*

A-1. To convert woollen count into universal count, use the following formula:

$$T_t = \frac{1\ 938}{N_y}$$

where

T_t = universal count in tex, and

N_y = woollen count.

A-2. To convert universal count into woollen count, use the following formula:

$$N_y = \frac{1\ 938}{T_t}$$

where T_t and N_y are the same as in **A-1**.

A-3. To convert worsted count into universal count, use the following formula:

$$T_t = \frac{885 \cdot 8}{N_e}$$

where ,

T_t = universal count in tex, and

N_e = worsted count.

A-4. To convert universal count into worsted count, use the following formula:

$$N_e = \frac{885 \cdot 8}{T_t}$$

where N_e and T_t are the same as in **A-3**.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	killogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Conversion
Force	newton	N	$1 \ N = 1 \ kg \ 1 \ m's^2$
Energy	joule	J	$1 \ J - 1 \ N.m$
Power	watt	W	$1 \ W \quad 1 \ J's$
Flux	weber	Wb	$1 \ Wb - 1 \ V \ s$
Flux density	tesla	T	$1 \ T - 1 \ Wb/m^2$
Frequency	hertz	Hz	$1 \ Hz = 1 \ c/s \ (s^{-1})$
Electric conductance	siemens	S	$1 \ S \quad 1 \ A/V$
Pressure, stress	pascal	Pa	$1 \ Pa = 1 \ N/m^2$

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